

GREEN LEADERSHIP SERIES #6

# COP21

Outcomes and Effects on the Public Sector



Organized by:

**Dubai Science Park and Dubai Green Economy Partnership**

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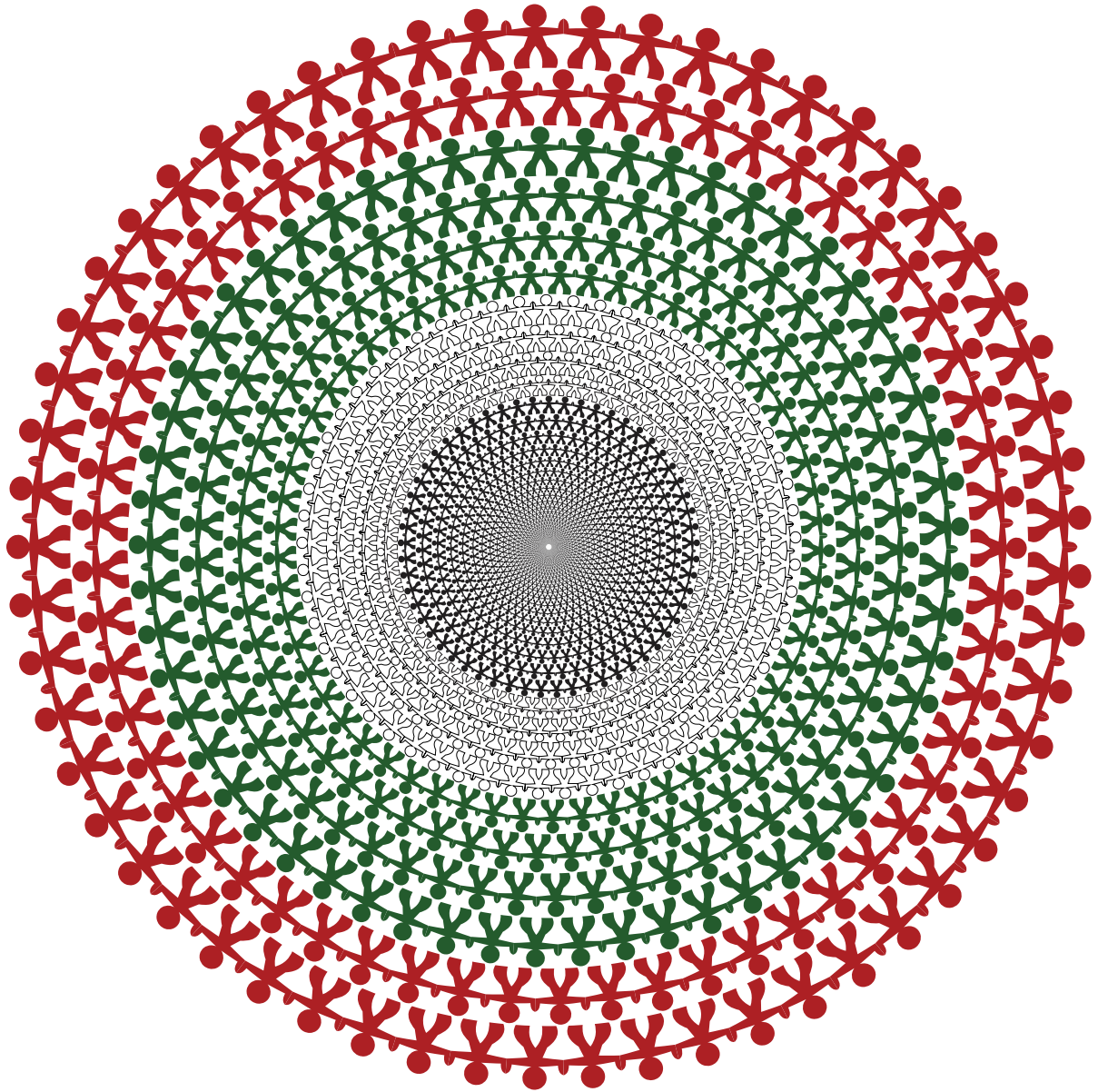
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# EXECUTIVE SUMMARY



The sixth edition of the Dubai Green Leadership Series (GLS) organized by Dubai Science Park and Dubai Green Economy Partnership titled ‘COP 21 Outcomes and Effects on the Public Sector’ saw experts from various spheres addressing the way forward in achieving economically viable and climate-resilient low-carbon development in the UAE. The country is among the 196 working towards a climate action plan, starting 2020, to measure impact every five years, starting 2023.

The 21st Conference of Parties or COP21 held in Paris in December 2015 not only brought together 196 countries in a pledge to take action to keep global warming to under 2 degrees Celsius – the threshold beyond which scientists caution irreversible warming and planetary change will be inevitable – but unprecedentedly also included the private sector more visibly and actively than before. COP21 signatories have pledged to unlock a minimum of USD 100 billion worth of financing per year from 2020 onwards.




In Paris, private sector companies from industries including cement, transportation, energy, and consumer products announced their

commitment to decrease carbon footprint, adopt renewable energy, and engage in sustainable resource management. Financial institutions including Crédit Agricole CIB, BNP Paribas, along with Bank of America and HSBC pledged to make available billions in investment over the next 15 years for the purpose.

To support the 20-country Mission Innovation, launched by the UAE, the US, Japan, Italy, and India, among others, which aims to double the current investment in energy research and development from the current USD 10 billion, billionaire philanthropist Bill Gates announced the formation of the Breakthrough Energy Coalition. Twenty others including Mark Zuckerberg, Jeff Bezos, Jack Ma, Richard Branson, and George Soros will add to Gates' USD 2 billion contribution to boost research and development into new technologies that deliver clean energy.

In this background of synergistic action, the day-long conference on May 16, 2016, held at The Address Dubai Mall, focused on COP21 and its impact on the public sector, along with discussing the potential road map that would include the private sector.

Among other things, participants discussed ways in which the private and public sectors could work together. Issues discussed include:

-  Greater definition of roles for each sector
-  Legislative frameworks for public-private partnerships
-  Examples of successful PPP in the renewables sector
-  Need for diversification of energy sources
-  Engaging the general population in renewable energy by effecting behavioral change

Senior representatives for various stakeholder organizations in Dubai shared insight on pioneering and proven developments that will shape the renewable energy sector in coming years.

# PARTICIPANTS

*Keynote Speaker*

**His Excellency Dr. Thani Al Zeyoudi**

UAE Minister of Climate Change and Environment

*Conference Chairman*

**Marwan Abdulaziz Janahi**

Executive Director of Dubai Science Park

**Ahmed Buti Al Muhairbi**

Secretary General of Dubai GEP and Dubai Supreme Council of Energy

**Meshayel Omran Al Ali**

Director of Clean Energy and Climate Change, UAE Ministry of Energy

**Pedro Banda**

Director of Research and Development, Dubai Electricity and Water Authority

**Taher Diab**

Director of Strategy and Planning, Dubai Supreme Council of Energy

**Kishan Khoday**

Team Leader, Climate Change, United Nations Development Program

**Abdulla Rafia**

Assistant Director General of Engineering and Planning and Head of Sustainability Committee, Dubai Municipality

**Mohammed Abdulkareem Al Shamsi**

Acting Executive Director, Suqia

**Subramanya Prasad**

Business Support Manager, Blue

**Martin Hupts**

Chief Executive, Phanes Group

# DISCUSSION DIGEST

- ▶ The COP21 agreement and the UAE's initiatives in the renewable energy sector will redefine the role of the public sector and create greater engagement with the private sector as both work together to achieve low-carbon, climate-resilient development in the UAE.
- ▶ Best-practice examples of PPP exist globally and offer knowledge, solutions, and learning. The problem belongs to everyone and the solutions need all stakeholders to work together – this includes government, non-governmental bodies, financial institutions, private sector companies, researchers, and utility providers.
- ▶ The best practice highlight the increased efficacy of local solutions in the context of local realities, strengths, and limitations – particularly in suggesting which alternate sources of energy are best suited.
- ▶ Future trends in the sector put the spotlight on research, innovation, and diversification of energy sources, along with economic viability and optimization of existing strengths. Storage of renewable energy is a key preoccupation.
- ▶ When all stakeholders get together at the decision-making table, the role of the user or consumer needs to be highlighted. A sharper focus on user behavior analysis will ensure that salient features of the agreement find an echo among everyday users.

THEME ONE

# MAKING PUBLIC-PRIVATE PARTNERSHIPS WORK





The sixth edition of the Dubai Green Leadership Series (GLS) organized by Dubai Science Park and Dubai Green Economy Partnership titled 'COP 21 Outcomes and Effects on the Public Sector' saw experts from various spheres addressing the way forward in achieving economically viable and climate-resilient low-carbon development in the UAE. The country is among the 196 working towards a climate action plan, starting 2020, to measure impact every five years, starting 2023.

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In Paris, private sector companies from industries including cement, transportation, energy, and consumer products announced.

The minister said the engagement of the private sector and its close collaboration with the government, an important component of the Paris agreement, is crucial in the context of the UAE's transition to a low-carbon economy.

One of the key events being organized in October 2016 in Dubai, he said, would be the 2016 UN Environment Program Finance Initiative Global Roundtable and Annual General Meeting. The event, hosted by the Ministry of Climate Change and Environment with support from the UAE Central Bank, would highlight the involvement of financial institutions and non-governmental organizations.

It would discuss issues as varied as the role of the global financial sector in addressing sustainable development and climate change agendas in specific sectors, such as climate change mitigation and decarbonizing finance; resilient and sustainable cities and communities; clean energy and water; and financing small and medium-sized enterprises. Green Islamic finance, policy, and regulatory frameworks for a sustainable financial system, and sustainable finance innovation, would also be addressed.

The minister stressed on the importance of having basics in place. Modern and resource-efficient infrastructure using the latest emission-reduction technologies in public transport and construction, and innovation through education were among the measures that would ensure environment protection, he said.

It is clear that the UAE has transitioned from being an adopter to taking up a leadership role with global influence.



Dubai's Urban Agenda 2020 envisages a city of happy, creative, empowered people in an inclusive and cohesive society. The smart sustainable city would be a pivotal hub for the global economy



## THE ROLE OF DEVELOPMENTAL BODIES

International developmental bodies work in close conjunction with government to create responsible systems and strategies. Kishan Khoday, Team Leader, Climate Change, United Nations Development Program said UNDP is involved in USD 2.4 billion worth of projects related to climate change in 144 countries around the world. Half of this work is related to mitigation and the other half to adoption of renewable energy and making food and water security resilient to climate change.

“We’re supporting the agenda for implementation in all our member states. We’ve helped create the national climate plans in 45 countries and help to implement them globally at national levels.”

UNDP helps mobilize financing and establish public instruments, laws, regulation, and institutions to achieve the goals of climate-resilient development. Organizations such as UNDP work with governments to create social infrastructure which allows the private sector to step in at the granular level.

UNDP’s success stories in the Arab world include helping the Government of Dubai conceptualize and establish Dubai Carbon, the launch of the Saudi Energy Efficiency Center, and Centers of Excellence in Bahrain and Kuwait.

“The future goes beyond the oil export based economy. We’re trying to rethink the development model,” Khoday said.



## INCLUSIVE VISION FOR PUBLIC AND PRIVATE SECTOR

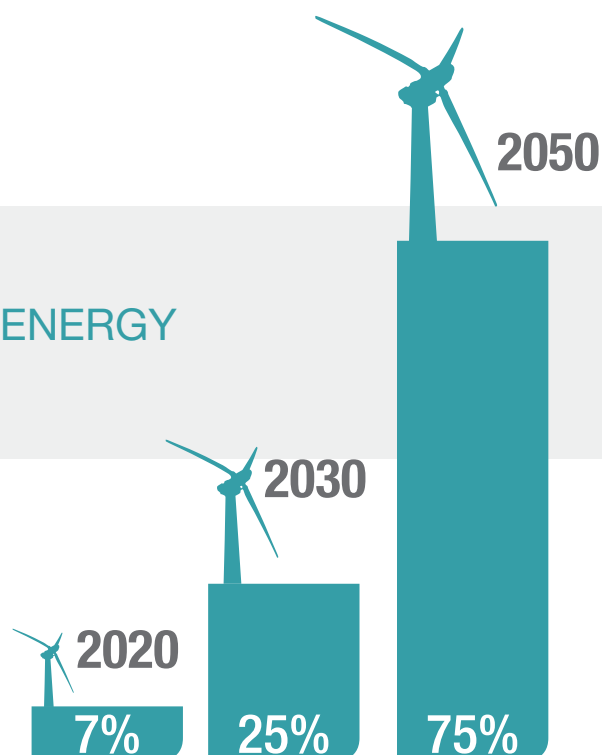
Marwan Abdulaziz Janahi, Executive Director of Dubai Science Park, underlined the importance of an inclusive vision and strategy that brings the public and private sectors on to a single platform on goals and targets related to low-carbon development. The next step is to make the vision a reality via effective strategy.

The need to translate thought into action and policy into projects was underscored by several speakers at the conference.

Abdulla Rafia, Assistant Director General of Engineering and Planning and Head of Sustainability Committee, Dubai Municipality, said: “We need to turn initiatives into projects so we get results.”

The Smart City initiative announced by His Highness Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President, Prime Minister and Ruler of Dubai, covers the six pillars of transport, communications, infrastructure, electricity, economic services, and urban planning, while safeguarding the environmental, economic, and social needs of Dubai’s growing population. Dubai’s vision is to create “a city of happy, creative, empowered people in

## PERCENTAGE OF DUBAI'S ENERGY FROM CLEAN SOURCES



an inclusive and cohesive society”, Rafia said, positioning the city as the preferred place to live, work, and visit. “A smart sustainable city, a pivotal hub for the global economy, a pioneering and excellent government” are all woven into the vision and create opportunities for the private sector under Dubai’s Urban Agenda 2020.

A legislative framework for such partnerships came into place in November 2015, which currently excludes from its scope projects related to the production and supply of water and electricity. Dubai has implemented the PPP Law (No. 22 of 2015) to promote and facilitate the use of public-private partnerships as a means for the delivery of projects in the emirate.

### DUBAI PPP COUNCIL

Taher Diab, Director of Strategy and Planning, Dubai Supreme Council of Energy said the PPP model has been so successful in the energy sector that he recommends “a Dubai PPP Council through which the emirate can pursue all its infrastructure projects.” In fact, the proposal is going to be discussed “with key stakeholders,” he said.

A clear and transparent policy that drives programs ensures the vision cascades down to each stakeholder. Appropriate commercial terms – e.g.

Rethinking the development model is essential to create a non-oil based economy

DEWA, where the cost of energy for consumers is not subsidized – make projects economically viable and attractive for private companies. More PPPs in renewable energy and efficiency-related projects will help Dubai achieve the status of a regional green energy hub.

Diab stressed that commercial terms are becoming more attractive due to multiple factors, including the fact that “technology has shifted East, making clean energy more affordable.”

Granularity is essential in the success any PPP model. Diab said: “It boils down to stakeholder engagement and how you structure your tender.”

## DETAILED STRATEGY FOR PPP PROJECTS

Private sector participants at the conference agreed with these points. Martin Haupts, Chief Executive of Phanes Group brought in the adage “follow the money”, saying the involvement of the private sector and financial institutions in the COP21 agreement was a smart move.

He shared two PPP examples, one in Germany and the other in Singapore, to bolster his point. Germany is seen as a world leader in energy transition, having promised emission cuts ranging up to 40 percent from 1990 levels by 2020, and 80 percent cuts by 2025. In 2015, 33 percent of the country’s energy came from renewable sources and it is hailed as a model for power will be generated power in future via wind, biomass, and photovoltaics.

However, the energy company, E.ON, due to the impact of *energiewende*, or transition to green energy, witnessed substantial losses of EUR 10 billion in two years due to significant impairment charges. Analysts say these are largely due to the government company being mandated by law to buy solar and wind energy at high prices and sell it at a loss on power exchanges.

“There was a cornucopia of public subsidy emptied over anything that sounded green, whether it was biomass or solar. Plus there was a harsh misalignment of resources that dis-incentivizes private investors,” Haupts said, using this as an example of what not to do when implementing PPP.

As an example of a well-structured system, he cited Singapore's efforts to become water-resilient. The island-nation has little land on which to collect and store rainwater and the quest for a diversified and sustainable supply of water led to the formation of the Four National Taps system. This uses local catchment water, imported water, highly-purified reclaimed water, and desalinated water.

The 3P model of People, Public, and Private involves a carefully detailed methodology. "The reason why it was successful is because of the high granularity and smart direction of resources where some elements of water generation were public and some private. Desalination, for instance, was given to the private sector under long-term agreements," Haupts said, adding that the best format for PPP models is when the public sector sets the tone and the private sector takes care of the granular implementation. He also cited examples from the UK, where the public sector struggled to implement solutions at household level due to multiple factors such as suitability of houses and random selection, among others. As the private sector partner, the Phanes Group, he said, installed customized micro-generation systems for solar energy in 3,000 low-income housing units.

For PPP projects, it's essential that price points are made as attractive as large projects using economies of scale.

Haupts said private sector investments are crucial in achieving the goals set out in the Dubai Clean Energy Strategy, which aims to provide 7 percent of Dubai's energy from clean energy sources by 2020, 25 percent by 2030, and 75 percent by 2050.

"It's not possible to put solar panels on every rooftop without any private money. As we have seen, we need household-level integration. The public sector can define the strategy but where the rubber meets the road, we need the private sector," he said.

To achieve the vision of solar panels on every roof in Dubai, the public and private sector need to work together, Haupts said. "In the day-to-day side of things, panels need to be cleaned and maintained. This is private sector business and it needs to go hand-in-hand with the public sector."



## RECOMMENDATIONS

- ▶ From vision to policy to strategy, the public sector sets the tone, allowing the private sector to contribute via effective implementation and economic viability
- ▶ International developmental bodies work together with the government to create viable policies for a future without oil, translating them into institutions that can act as platforms for public-private partnerships.
- ▶ Granularity and smart allocation of resources – financial, infrastructural, legal, and personnel – is essential to the success of PPPs.
- ▶ Both sectors work towards creating relevant, actionable, result-oriented innovation.



## THEME TWO

# APPLICABLE INNOVATION AND TAKING CHARGE OF RESEARCH



Applicable innovation is at the heart of a green economy's transformation into a green knowledge economy.

Pedro Banda, Director of Research and Development, Dubai Electricity and Water Authority (DEWA), said a knowledge-based economy allows room for research and development, which is essential for ownership of technology and projects being set up.

"The first step is to have a vision and strategy and the last is ownership. Research and development through partnership is a key driver and a link between the public and private sectors. The public sector has to be concerned about the origin of the technology. Education creates a body of economic value," he said.

Developing technology products and services that can bring economic growth is a key part of innovation. Banda said that research is a driver for innovation.

## REWARDING INITIATIVE

Encouraging and rewarding innovation attracts global talent for local causes. Mohammed Abdulkareem Al Shamsi, Acting Executive Director of Suqia, the UAE's Water Aid Foundation, cited the example of the Mohammed bin Rashid Al Maktoum Global Water Award, presented by Suqia, under the umbrella of the Mohammed bin Rashid Al Maktoum Global Initiatives, to find sustainable solutions for water scarcity, by using solar energy to purify and desalinate water.

Applicable innovation transforms a green economy into a green knowledge economy

The USD 1 million initiative to attract talent and global innovation will encourage research and development to further enhance the technology of desalination and water filtering, with the ultimate aim of providing clean drinking water to people.

The award covers three categories: Innovative Projects (USD 500,000), Innovative Research and Development (USD 400,000), and Innovative Youth (USD 100,000).

Applications are judged on the basis of technology, design, environmental alignment, creativity, innovation, health and safety, and sustainability. The goal is to receive designs or prototypes for using solar energy to produce, desalinate, purify, or effectively manage water resources.

Al Shamsi stressed that Suqia's work is largely collaborative; the establishment works closely with like-minded national and international organizations towards eradicating poverty and disease. "We are constantly looking for solutions and collaborating with both public and private sector bodies. Globally, we collaborate with different NGOs, including the Bill and Melinda Gates Foundation," he said.

Spreading knowledge and empowering communities through entrepreneurship and innovation are the main pillars of this work.

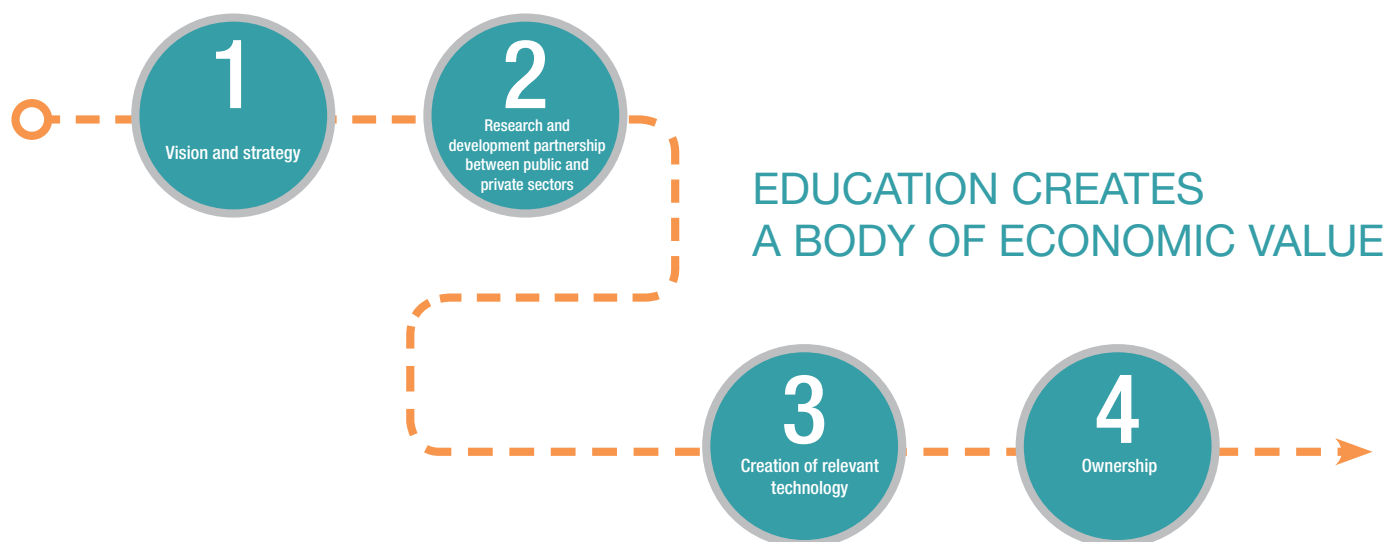
Banda said DEWA works with universities to address key issues. "We're looking at how to encourage basic research that can be scaled for application across DEWA's real-world projects."

The model is witnessing some success. The UAE, Dubai in particular, has emerged as a climate innovation lab, said UNDP's Khoday. "It is a microcosm of the planet. We build on the model and learn from the success stories that are starting to emerge from Dubai."

## NEED-BASED TECHNOLOGY

In an open environment where applicable innovation finds acceptance and encouragement, the private sector can provide specific solutions.

Subramanya Prasad, Business Support Manager at Blue, the AI Serkal Group's Environmental Division, said new technology and products could be deployed to resolve environmental conundrums.



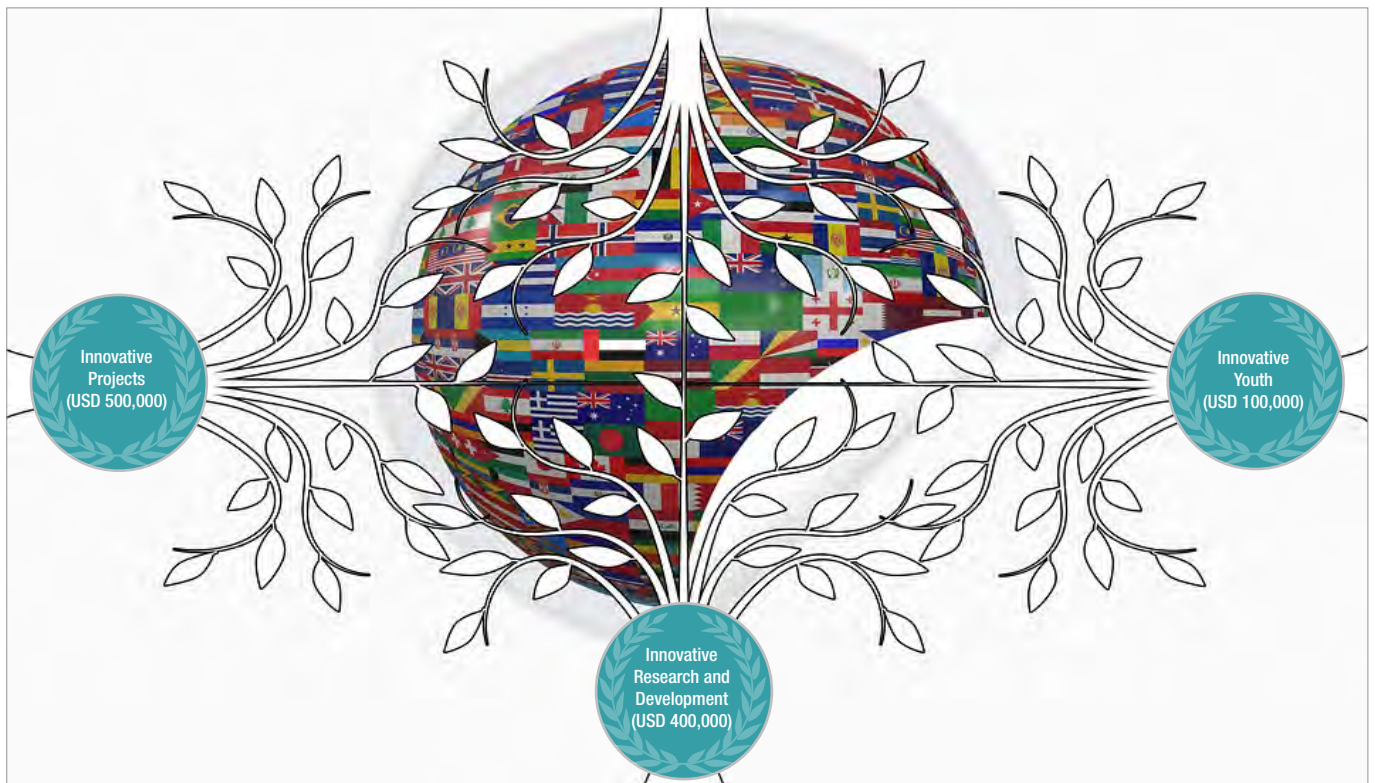
“There is 65 percent dependency on water from ground water sources. When there is a need there is scope for innovation and improvement,” he said. Prasad shared examples of a window insulation technology developed by the U.S. National Aeronautics and Space Administration (NASA) and certified by Dubai Municipality for green buildings, which works for both existing and new structures. “The In’Flector addresses one of the major energy efficiency concerns in the building industry by stabilizing indoor temperatures,” he said, emphasizing its importance in the context where 75 percent energy consumption comes from buildings.

“New buildings will reduce our dependency on energy. We can save 82 percent through heat reduction,” he said.

Another initiative, Envirol, treats grease waste generated by food establishments to produce fertilizer, water, and refined oil. The fertilizer is used as compost, the water for irrigation, and the oil is repurposed for use in the laundry industry.

Envirol was born as a joint initiative between Dubai Municipality and the Al Serkal Group, underlining the importance of public sector support for private sector research into need-based innovation.

## MOHAMMED BIN RASHID AL MAKTOUM GLOBAL WATER AWARD



### RECOMMENDATIONS

- ▶ Applicable innovation means ownership of technology from lab to market
- ▶ Attracting global talent for solving local problems means encouraging innovation at all levels by rewarding solution-based innovation regardless of its origin
- ▶ The private sector contributes by constantly monitoring targets set by the public sector and providing solutions based on assessment of needs

THEME THREE

LOCALLY RELEVANT  
POLICY AND ACTION IN  
RENEWABLE PROJECTS



For all stakeholders working towards a sustainable world, it is crucial not to view the renewable energy sector as a monolith. For solutions to be effective, they need to be rooted in local policy and work in parallel with government action.

Each entity works effectively by keeping global goals in mind to implement local policy. Dubai Municipality's Strategy 2021, for instance, puts the city's environmental sustainability at the center of a series of initiatives such as: energy efficiency, clean energy incentives, green building guidelines and rating system, marine resources protection and management, ground water protection, smart waste management, etc.

Among its strategic goals, or key performance indicators, are bringing down carbon dioxide emissions to 17.50 metric tons per person by 2021.

Utility scale projects have already set the tone in the UAE. The Mohammed bin Rashid Al Maktoum Solar Park is one of the world's largest renewables projects based on an independent power producer (IPP) model. To be completed in three phases that consist of solar farms using PV technology, the long-term project will also include concentrating solar power (CSP). The total capacity of the project is planned to reach 3,000 MW.

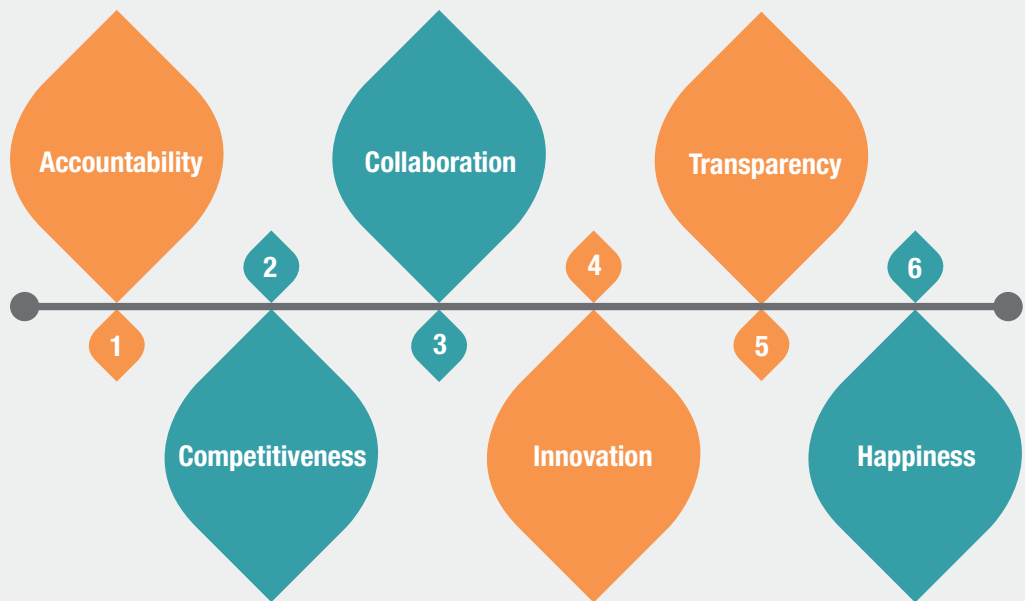
In March 2015, DEWA launched a voluntary net metering scheme to encourage companies and private individuals to install solar power panels on their roofs. Solar panels are to be made mandatory for all buildings in Dubai by 2030.

In Abu Dhabi, the Shams solar power station, a 100 MW CSP plant, has been operational since 2013. The USD 600 million Shams 1 is the largest CSP plant outside the United States and Spain and is expected to be followed by Shams 2 and Shams 3.

DEWA's Sustainable Building in Al Quoz, Dubai, has already set an example by walking the talk. It is the first sustainable government building in the UAE and the largest government building in the world to receive a Platinum Rating for green buildings from Leadership in Energy and Environmental Design (LEED). The building saves 66 percent of energy consumption and has a solar power plant with a capacity of 660 kW. It also reduces water consumption by 48 percent.

Among DM's sustainable projects is Desert Rose, a smart sustainable satellite city that provides housing for Emiratis. The city will produce 3,315 tons of oxygen per day and reduce carbon dioxide emissions by 12,600 tons per year. It will replace Portland cement with the new "green cement", which increases the life of a building by 95 percent.

## DM STRATEGIC VALUES





Dubai Municipality has made the use of sustainable concrete mandatory for all new projects since April 2015. Green cement increases the service life of structures with reduced maintenance. It is cost-effective and promotes environmental sustainability. Moreover, structures built using green concrete have a better chance of surviving a fire.

## SOLUTIONS IN STEP WITH VISION

Given the scale of developments such as these, it is necessary that solutions offered by the private sector work in tandem.

Phanes Group's Haupts said he envisages three directions for the renewables sector in the UAE: solar plus water, solar plus food, and solar plus storage.

"Storage of power is the next area of growth in renewable energy for the UAE, which is currently implementing utility scale projects to reduce the dependence on fossil fuels," he said.

These developments also address the cost factor, which has emerged as a challenge in developed countries. In the 200 MW second phase of Mohammed bin Rashid Al Maktoum Solar Park project, the winning bid set a new record-low tariff per kWh, coming in at about 20 percent lower than any previous unsubsidized power purchase agreement (PPA) in the world. "If different units of electricity – solar photo voltaic and conventional, for instance – are comparable with each other in terms of cost, it is financeable. The clear answer is that solar is competitive and cheap," Haupts said.

Climate conditions also play a part in creating viable solutions. While the abundant sun is an obvious source of power in the Middle East, the sand plays its part too. At Masdar City in Abu Dhabi, which relies entirely on renewable energy from power generated by a 10 MW solar PV power plant located on site and 1 MW of rooftop solar panels, the original plans of rooftop panels were adjusted to local climate conditions. Compared to rooftop models, Masdar found it more resource-efficient to clean the sand off ground-mounted panels at a single location.

Effective solutions are rooted in government policy and local action

## SEEKING DIRECTION FOR GROWTH

For the UAE, water security is essential. Solar or wind-powered desalination is preferable to thermal desalination, which contributes to climate change via greenhouse gas emissions, adding to the local climate conditions which necessitate it in the first place. Solar energy can support energy-intensive water processes at key points such as desalination and transportation or pumping.

Food security is another key area. The UAE imports about 80 percent of its food supply and encouraging local food production is being increasingly seen as a solution. “Local production costs are high and solar can support this directly and indirectly as a centralized energy supply,” Haupt said.

Local companies are already following the vision set by the leaders. Emirates Modern Poultry has announced that it is investing in solar plants for its Dubai and Liwa factories with the aim of sourcing 60 percent of its electricity needs from renewable energy over the next five years. Already, there is a pilot project at the Dubai farm using solar panels. The company has announced that it is reducing operating costs by limiting water usage and conserving feed.

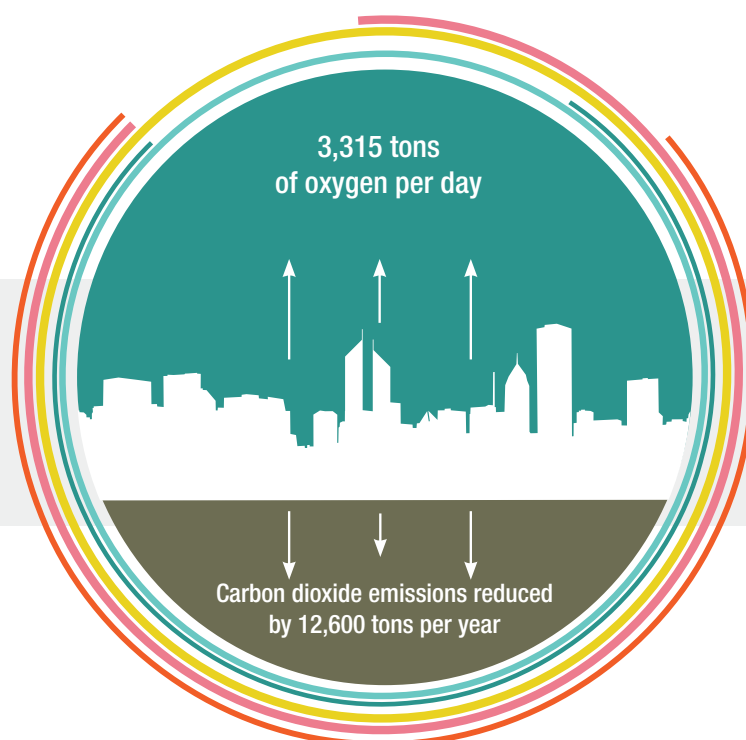
## DEVELOPMENTS PIPELINE

The PPP law, cited as a laudable legal initiative, currently excludes the power sector. To realize the full potential of the PPP law, these sectors need to come in by means such as joint power purchase agreements, defined by the World Bank as those that “secure the payment stream for a Build Own Transfer (BOT) or concession project for an independent power plant (IPP). It is between the purchaser ‘offtaker’ (often a state-owned electricity utility) and a privately owned power producer.”

Green Islamic instruments are part of the vision. Haupt said the conventional sector project financing is nascent and can be improved. There is increased evidence of resolve from the public sector to foster investment. Financing instruments need to be put in place, including green Islamic instruments.

Dubai will host the third World Green Economy Summit 2016 in conjunction

## DESERT ROSE



with Water, Energy, Technology and Environment exhibition and the Dubai Solar Show 2016. Hosted by DEWA under the umbrella of the Dubai Supreme Council of Energy, in collaboration with World Climate, the summit is supported by the United Nations and is likely to see new initiatives announced.

Already DEWA has announced commissioning plans for a solar powered reverse osmosis desalination facility with the capacity to produce 13,000 gallons of water per day. Also under discussion is a free zone dedicated to green or sustainable businesses to encourage private sector investment.

## RECOMMENDATIONS

- ▶ Working together with developmental bodies, national governments create strategic targets and key performance indicators. This facilitates a goal-based approach to energy projects
- ▶ Utility scale projects set the tone not only for local application but also position the nation as a leader rather than an adopter
- ▶ The private sector responds by playing a key role in project implementation
- ▶ Extending the scope of the PPP law to include the renewables sector would open avenues for development

THEME FOUR

# STAKEHOLDER ENGAGEMENT SYSTEMS ARE CRUCIAL



Stakeholder engagement systems become the foundation on which a thriving green economy is sustained. Events such as the Green Leadership Series are crucial to bringing stakeholders together on a discussion platform.

Stakeholders of entities such as DEWA have been identified as the government (federal and local), suppliers (strategic, core, and basic), customers (residential, commercial, industrial, and others), employees (board members, top management supervisory, middle management supervisory, non-supervisory employees, and other grades), strategic and main partners, and society comprising environmental entities, general public and related institutions, media, and opinion leaders.

Of these, end-users form the mass base where any change needs to take effect. Stakeholder engagement has been identified as key for most organizations. A strategy to identify and reach out to stakeholders and the end-user to effect behavior change is essential for the success of green economy initiatives.

According to available data, the residential sector is responsible for less than 30 percent of energy consumption in Dubai, and commercial takes less than 50 percent. Of these, buildings in different sectors (governmental, commercial, and residential) consume around 80 percent of electrical energy.

Research has shown that effective regulation governing the built-environment energy consumption issues, as well as replacing fossil fuels with clean energy sources, will reduce the emission of carbon dioxide by 50 percent.

UNDP's Khoday spoke of reforms and fiscal incentives to induce behavior shift. At the UN level, Green Ambassadors are engaged to raise public awareness of issues. "We also have new generation climate innovation labs for youth and youth exchange between countries," he said.

End-users form the mass base where any change needs to take effect

Suqia's Al Shamsi, in his other role as Senior Manager of Climate Change and Sustainability at DEWA, said that stakeholder engagement was identified as a challenge.

In a SWOT analysis in DEWA's Sustainability Report 2014, the latest available, "uncertainty in demand forecasting, public concerns about sustainability impacts, and rising costs" are identified as threats and "knowledge management strategy" is seen as an area of improvement, even as "strong leadership and high quality utility infrastructure" is seen as a strength.

"We are looking to tap into the behavior science aspect to make people more aware," Al Shamsi said.

## A FIVE-STEP APPROACH

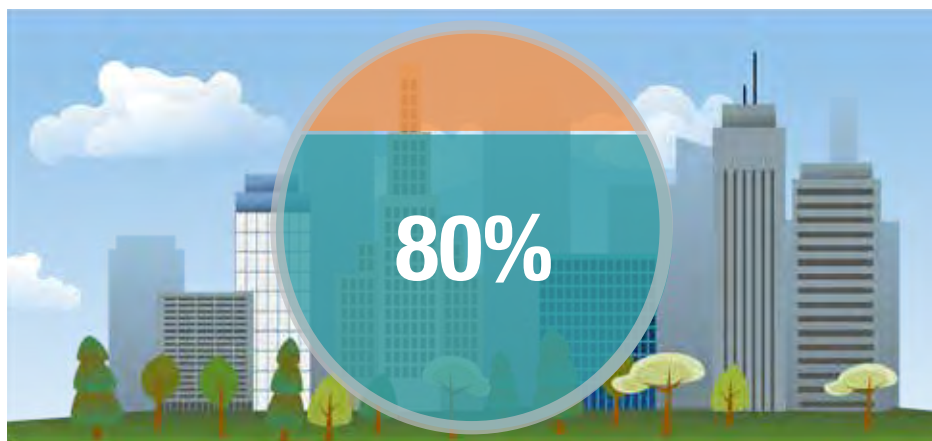
DEWA identifies a five-step approach to stakeholder engagement: inform, consult, involve, collaborate, and empower. The Inform approach is a one-way process of providing information to the stakeholder via awareness sessions, marketing campaigns, media events, student visits, incentive programs, road shows, and corporate strategy presentation sessions.

Consulting, which involves the stakeholder asking questions and the organization providing answers, includes happiness surveys for all stakeholder groups, written and verbal communications, topic-specific surveys, direct customer feedback, and supervisor interaction.

The third level is to Involve stakeholders, which comes with two-way engagement and learning, but stakeholders act independently. One-on-one meetings, supplier engagements, seminars, customer suggestion schemes, and mystery shoppers form a part of this level.

To Collaborate, which means joint learning, decision-making, and actions, takes sustainability to stakeholder workshops, joint ventures, and public-private partnerships. To Empower is the final level to aspire to, where stakeholders play a role in governance and actively support government policy and regulation.

## ENERGY CONSUMPTION BY BUILDINGS AS SHARE OF TOTAL CONSUMPTION



Meshayel Omran Al Ali, Director of Clean Energy and Climate Change at the Ministry of Energy, said engagement and participation is crucial. “It is important to us as a country to have public engagement through initiatives and campaigns,” she said.

She mentioned that the UAE will be part of a sub-group of ministers at the seventh Clean Energy Ministerial (CEM7) held in San Francisco, US, in June 2016. The annual meeting of energy ministers and other high-level delegates from the 23 CEM member countries and the European Commission will provide an opportunity for the major economies to collaborate on solutions that advance clean energy globally and demonstrate tangible follow-up actions to COP21.

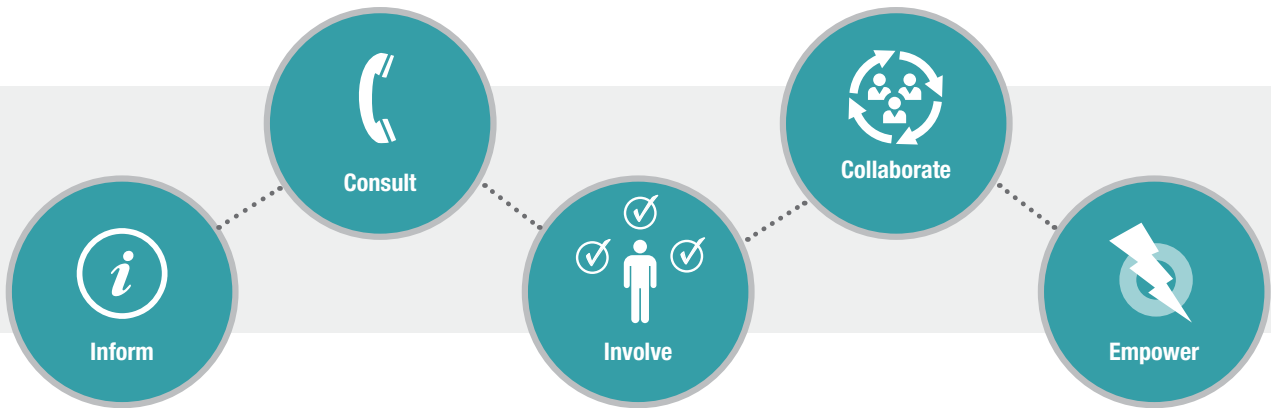
For these solutions to take effect, she stressed the importance of creating a good environment for investors and entrepreneurs, for innovations to go from lab to market, with international collaboration when needed.

### QUICK WINS

DSCE's Diab said one of the “quick wins” for reducing consumption was seen in 2011 with a new charge on water and electricity.

He spoke of platforms where education plays a big role and the cited the example of a Dubai school making a difference in recycling awareness where children received tokens for bringing in plastic. These tokens counted for credits in the sustainability course.

## 5 STEPS IN STAKEHOLDER ENGAGEMENT



### RECOMMENDATIONS

- ▶ Stakeholders include government, developmental bodies, private sector, research institutions, and users
- ▶ Stakeholders need common platforms to work together instead of working in silos
- ▶ User behavior change requires specialized stakeholder engagement strategies to be implemented
- ▶ For quick wins to translate into stakeholder happiness, buy-in is essential at every stakeholder level – from government to every individual in society



## THEME FIVE

# USE OF RENEWABLE ENERGY SOURCES IS DIVERSIFYING



Utility companies are undergoing a seismic shift to adapt to renewable energy sources. Diversification of the business and power generation portfolio along with the potential for interconnecting the capacities of various grids – federal and regional grids in the UAE’s case – remains a priority.

DEWA’s Banda said utilities need attention around the world. “The business model for utilities is changing. We are going from a carbon and fuel-based system with assets that last a long time to a very dynamic model in which distribution and generation are crucial.”

Already, the REN21 global status report has found that about 147 GW of renewable electricity came online in 2015, indicating the largest annual increase ever, equal to Africa’s entire power generating capacity. Clean energy investment increased to USD 286 billion, with solar energy accounting for 56 percent of the total and wind power for 38 percent.

Overall, more than twice as much money was spent on renewables than on coal and gas-fired power generation, the report said.

Most countries have set aggressive targets for renewable energy use. But there is a gap between targets and current shares. The UAE, for instance, has set a target of 7 percent of renewable energy by 2020. The 2015 status, according to the REN21 global status report, is less than 1 percent.

According to locally available data, the level of greenhouse gas (GHG) emissions increased by 5 percent per year from 1994 to 2013, with the energy sector accounting for 75 percent of all GHG.

## The business model for utility companies is changing worldwide

How renewable energy is generated and integrated into the public utility model is part of the transition. Newer companies and services with super-specialized technologies are fast appearing in the market, leading to quick development of the energy industry, hitherto dominated by a few majors and controlled by governments in many cases. With these new developments, SMEs, manufacturers, and logistics companies are thriving as well.

Banda spoke of the importance of diversifying energy sources and creating local models. “To bring as much as possible renewable energy into the picture and diversify technology, you cannot apply the same model as Europe and the US,” he said, emphasizing that not only solar but wind energy may be used in the future in the UAE.

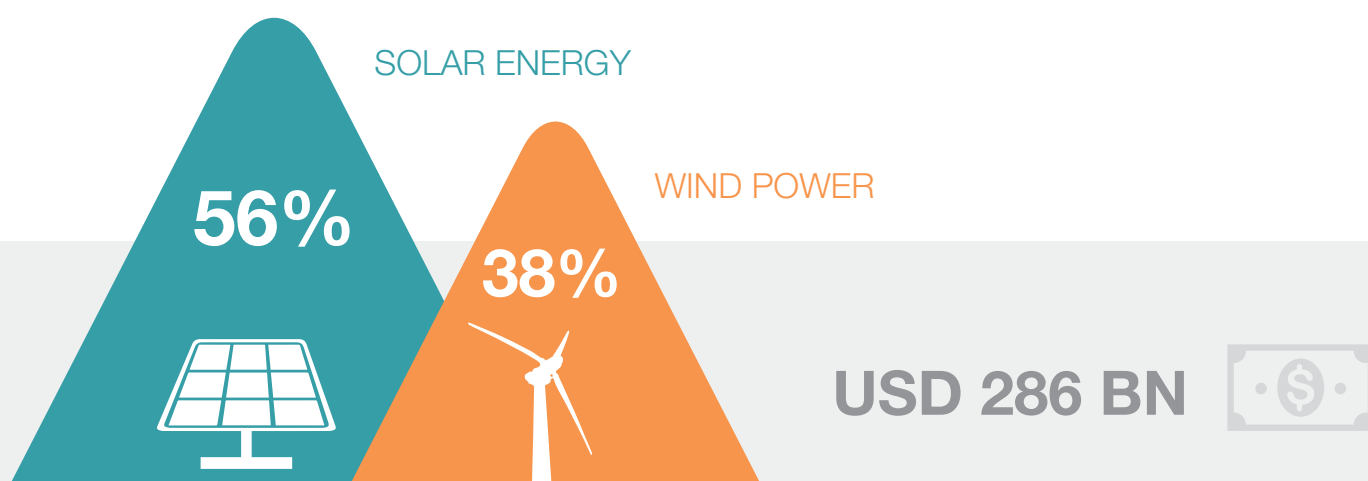
Planning a resource-rich model requires integration of technology into energy at various levels. “We have to tune the component of solar radiation. There are particles in the environment. Knowing how much sun we have, when we have solar power, and how we can plan it with the rest of the resources is part of the challenge,” he said.

For countries to depend on renewable energy up to 75 or 80 percent in a few years, technology to develop storage of such energy is required.

Phanes Group’s Haults called storage “the next big thing in renewable energy to enable off-grid electricity support for development of self-sustainable ecosystems.”

Storage enables power supply during off-peak hours and has the potential of 24/7 service. It enables balancing the grid to increase the capacity of solar energy. This is the next sector to seek commercial and technology support for holistic and tailor-made solutions.

## CLEAN ENERGY INVESTMENT IN 2015 WORLDWIDE



### RECOMMENDATIONS

- ▶ The renewable energy sector is diversifying in using sources of renewable energy
- ▶ The role of utility companies is fast evolving as they reassess their role in balancing economic viability with renewable energy use
- ▶ Diversification of energy sources includes not only shift to solar but also using wind and water sources efficiently
- ▶ Power storage will be the next big thing in transition from conventional to renewable energy

# INNOVATIONS AND INITIATIVES REVIEWED AT THE CONFERENCE

## I. Desert Rose

Located south of Emirates Road in Dubai, the sustainable city of Desert Rose will house 120,000 nationals and 40,000 expatriates by 2025 in affordable housing. The AED 30 billion project is being primarily financed by Dubai Municipality, and may be delivered by 2020 if the Government of Dubai so desires.

Desert Rose will have 1 million square meters of diverse activities and will include social infrastructure such as schools and hospitals. Homes are being built in proximity to a light electric rail system, which will be connected to Dubai Metro.

The environment-friendly city, in the shape of a desert flower, will reduce the carbon footprint by 12,600 tons a year as it will have its own renewable energy plant with an anticipated capacity of 200 MW. Solar panels will be installed on all rooftops to produce renewable energy.

Desert Rose will have facilities for eco-walk and cycling with walkways shaded by trees. The project will have climate-responsive architecture, re-use of recycled sewage water for irrigation, zero emission, and will consume zero energy from external supply.





## II. Mohammed bin Rashid Al Maktoum Solar Park

Located south of Dubai, the solar power plant is the largest photovoltaic (PV) solar power facility in the region. It covers an area of 59 acres or 238,764 square meters, which is the equivalent of about 33 football pitches.

Named after His Highness Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President and Prime Minister and Ruler of Dubai, the plant's first phase of 13 MW was completed in 2014. Work on the next stage of 1,000 MW of concentrating solar power (CSP) has begun. An advantage of CSP is that thermal heat, which is used to produce electricity, can be stored easily. This makes possible to produce electricity after sunset.

The plant will have thousands of heliostats around a tower that will receive the radiation reflected by the heliostats. The heat-transfer fluid is then used to power the steam turbine to generate electricity.

The solar park project was implemented by Dubai's Supreme Council of Energy and is managed and operated by the Dubai Electricity and Water Authority (DEWA). It is expected to produce 1,000 MW of power by 2020 and 5,000 MW by 2030. When complete, the project will reduce 6.5 million tons of carbon emissions annually.



### III. Shams Power Project

The Shams power project is being built by Abu Dhabi in multiple stages. Shams 1 will displace 175,000 tons of carbon dioxide every year, equivalent to planting 1.5 million trees or taking approximately 15,000 cars off the road.

Shams 1 involves the design, construction, operation, and maintenance of a CSP plant near the town of Madinat Zayed on a build, own, operate basis. The plant has a total installed net rated power output of 100 MW and will implement a proven parabolic trough technology that has been operating successfully for more than 20 years at the SEGS plants in the Mojave Desert in California.

The first stage is expected to be followed by Shams 2 and Shams 3.

### IV. Solar retrofit for Dubai buildings

Dubai has introduced rankings and retrofitting guidelines to convert tens of thousands of old buildings to sustainable energy, including the installation of solar PV panels on the roof.

The new retrofitting law will depend on a framework that was developed into a set of technical standards by the Emirates Green Building Council in 2015. There are 120,000 buildings in Dubai and that many of these were built before any energy efficiency or sustainability regulations were in place. About 35,000 of these have been identified as being suitable for major retrofits and others could benefit from improvements in operational and maintenance practices to enhance their lifespan.



## V. Green concrete

Dubai has made the switch to green concrete mandatory from April 2015. New building coming up after that will have to use green alternatives for Portland cement, the major component of the concrete mix that emits toxic gases.

Since each ton of Portland cement produces an equivalent ton of carbon dioxide and other toxic gases, Dubai Municipality has made it mandatory for consultants and contractors to use greener and safer alternatives like fly ash, and ground granulated blast furnace slag.

Apart from causing less emission of dust and fumes, these are more resistant to water, salt, and sulfate damage and increase the lifespan of a building by up to 40 years. They also make structure more fire-resistant.



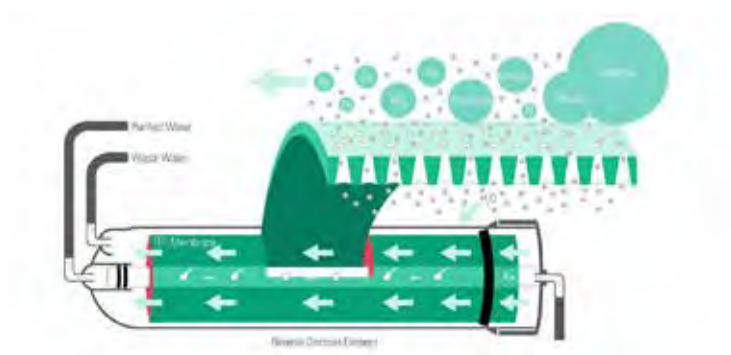
## VI. Solar powered water desalination plant

A water desalination plant operated by DEWA at the Mohammed bin Rashid Al Maktoum Solar Park is powered by a photovoltaic array and uses reverse osmosis technology to produce 50 cubic meters of drinking water a day.

The project aims to extract saltwater and desalinate it to produce water that is as good as bottled water, by using innovative technology. All electricity used to pump and desalinate water at the station will be produced via a hybrid electricity source that combines photovoltaic cells at 100 kW, and batteries with a capacity of 520 kWh per day.

The project will produce desalinated water by using solar energy and an integrated energy storage system, allowing the station to be operational 24 hours a day. In the future, this model will be applied on a larger scale to form more developed technology to produce water.

The project also supports DEWA and Suqia's efforts to supply people in poor countries with clean drinking water, by conducting specialized research regarding the production of desalinated water via the use of solar energy, storing it, and supporting water technology related projects to defeat drought.





## VII. In'Flector window panels

Using technology developed by NASA, the In'Flector window system can save energy costs and make a building a more comfortable place.

A building's window system has the highest infiltration, the highest conductivity, and highest solar radiation factor. The reason is glass. The In'Flector window insulator, brought to the UAE by Blue, an Al Serkal Group company, is the only known system that addresses all three areas in all seasons. In'Flector panels are reflective with solar filtering thermal shades. The panels assist with stabilizing indoor temperatures, allowing natural sunlight in and reflecting solar heat and UV rays.

Made of aluminum, carbon, and a UV layer, the panels cut 92 percent of UV rays, 80 percent of radiant heat, and 78 percent of solar heat gain. Energy costs are cut by roughly 41 percent and pay-back on investment occurs within 18 months.



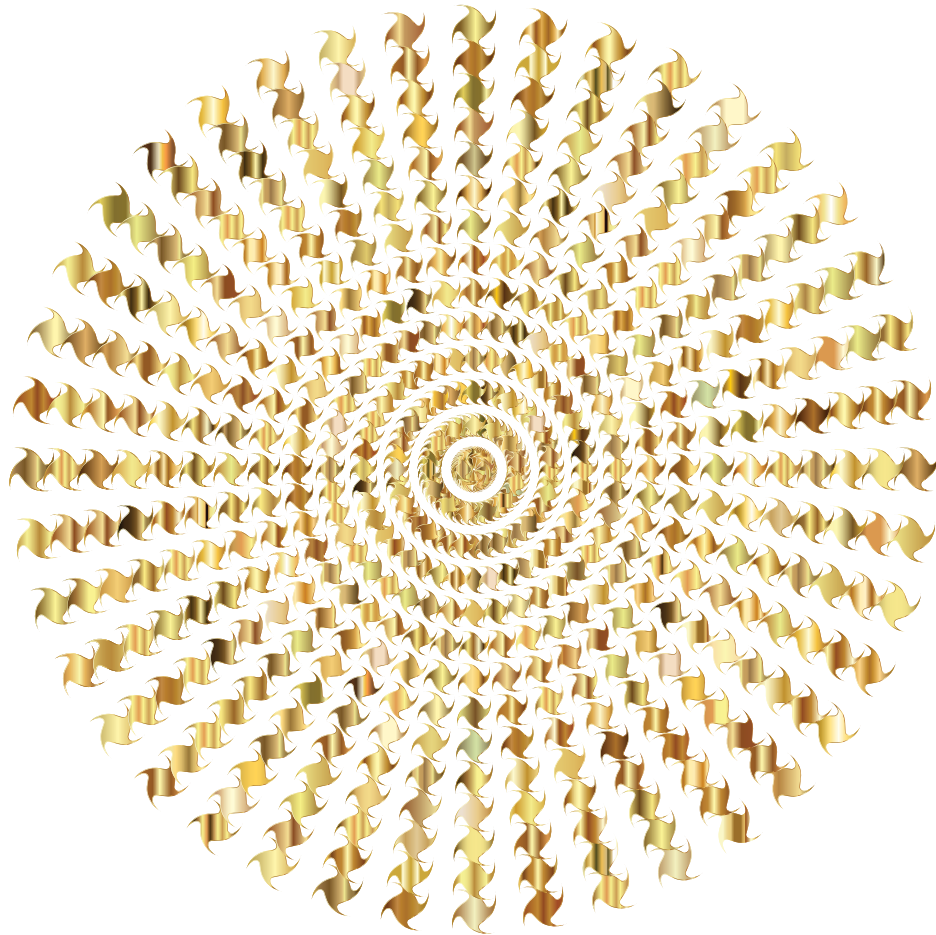
## VIII. Envirol grease recycling

A joint venture between Dubai Municipality and Al Serkal Group, Envirol is the region's only recycling plant that converts waste edible oil produced by food establishments and eateries across UAE to produce fertilizer, water and refined oil.

Grease traps act as interceptors when installed under the kitchen sink. They screen and retain oil, grease, and food waste in the form of solids and allowing the waste liquid to flow through. Grease traps (also known as grease interceptors, grease recovery devices, and grease converters) are plumbing devices designed to intercept most greases and solids before they enter a wastewater disposal system.

The waste collected in the grease traps is brought to the Envirol plant where it goes through an intricate process of separation into the three end products that can be reused for composting, irrigation, and production of laundry detergent.





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